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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,453	07/12/2005	Martine Mayne	13777-37	7851
45473 7590 08/31/2009 BRINKS, HOFER, GILSON & LIONE P.O. BOX 1340 MORRISVILLE, NC 27560				
EXAMINER MCCRACKEN, DANIEL				
ART UNIT		PAPER NUMBER		
1793				
MAIL DATE		DELIVERY MODE		
08/31/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/518,453

Applicant(s)

MAYNE ET AL.

Examiner

DANIEL C. MCCracken

Art Unit

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-42 is/are allowed.
- 6) ☒ Claim(s) 43-44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Citation to the Specification will be in the following format: (S. # : ¶/L) where # denotes the page number and ¶/L denotes the paragraph number or line number. Citation to patent literature will be in the form (Inventor # : LL) where # is the column number and LL is the line number. Citation to the pre-grant publication literature will be in the following format (Inventor # : ¶) where # denotes the page number and ¶ denotes the paragraph number.

Status of Application

The finality of the office action dated 1/14/2009 is withdrawn in light of the request for continued examination ("RCE") dated 6/12/2009. Claims 1-44 are pending, with Claims 2-3 amended.

Response to Arguments

Claim Rejections – 35 U.S.C. §112

With respect to the rejection of Claims 2-3 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, the amendments to the claims obviate the rejection. Accordingly, the rejection is WITHDRAWN.

Claim Rejections – 35 U.S.C. §102

With respect to the rejection of Claims 1-5, 8 10-12, 16-23, 28-31 and 43-44 under 35 U.S.C. 102(b) as being anticipated by Mayne, et al., *Pyrolytic production of aligned carbon*

nanotubes from homogeneously dispersed benzene-based aerosols, Chemical Physics Letters 2001; 338: 101-107 (hereinafter “Mayne at ___”), Applicants traversal is on the grounds that – succinctly stated – Mayne does not disclose forming the liquid under pressure, and does not form the aerosol or “finely divided liquid particles” by a “periodic injection system.” *See generally* (Remarks of 6/12/2009 at 9). Upon reconsideration, this is persuasive. While the “Bernoulli” principle mentioned by Applicants in their remarks discussing Mayne could be construed to “form a liquid under pressure” (*i.e.* negative pressure is still pressure) as required by Claim 1, such a construction would be unreasonable in light of Applicants disclosure, which mentions pressures “1 to 5 times atmospheric pressure.” (S. 29: 3-4). Furthermore, and particularly with respect to the apparatus/reactor claims (Claims 43-44), Mayne would appear to teach a continuous injection process/system versus the periodic injection process/system as claimed. Accordingly, the rejection is WITHDRAWN.

With respect to the rejection of Claims 1-5, 8, 10-12, 15-17, 20-23, 28-31, and 43-44 under 35 U.S.C. 102(b) as being anticipated by Kamalakaran, et al., *Synthesis of thick and crystalline nanotube arrays by spray pyrolysis*, Applied Physics Letters 2000; 77(21): 3385-3387 (hereinafter “Kamalakaran at ___”), Applicants present similar arguments related to the pressure and periodic injection systems. *See generally* (Remarks of 6/12/2009 at 11). These arguments have been considered and are persuasive for similar reasons as noted above. The rejection is WITHDRAWN.

With respect to the rejection of Claims 1-5, 9-12, 15-17, 20-22, 27-31, and 43-44 under 35 U.S.C. 102(b) as being anticipated by Terrones, et al., *Novel nanoscale gas containers: encapsulation of N₂ in CN_x nanotubes*, Chem. Commun. 2000: 2335-2336 (hereinafter “Terrones

at __”), Applicants present similar arguments related to the pressure and periodic injection systems. *See generally* (Remarks of 6/12/2009 at 12). These arguments have been considered and are persuasive for similar reasons as noted above. The rejection is WITHDRAWN.

Claim Rejections – 35 U.S.C. §103

Various rejections were made under 35 U.S.C. §103 which, as observed by Applicants, are “based on the primary references discussed above, Mayne, Kamalakaran, and Terrones, either alone or in combination with additional secondary references or official notice.” (Remarks of 6/12/2009 at 13). Applicants’ arguments have been considered, and are persuasive. The features for which the secondary references were relied upon do not cure the deficiencies of the primary references, namely lack of formation of the liquid under pressure and the periodic injection system as claimed. All prior rejections under 35 U.S.C. §103 are WITHDRAWN.

Allowable Subject Matter

Claims 1-42 are allowed. The following is a statement of reasons for the indication of allowable subject matter: The three references applied (and withdrawn) under 35 U.S.C. §102 which also served as the primary references under 35 U.S.C. §103 are representative of the art uncovered by the search. Spray pyrolysis methods for making carbon nanotubes are *per se* known, but – as discussed above – these methods do not teach the injection system with the specificity required by the claims.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

I. Claims 43-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claim 43, the connectivity of the elements in the last paragraph of the claim is not understood. Specifically, it is not clear what connectivity between the carrier gas intake, injection head, and evaporation device is implied. Furthermore, the “optional” language further obscures the connectivity required. As to Claim 44, the combination of “wall” with “ring” obscures what structure is implied.

Claim Rejections - 35 USC § 102

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

I. Claims 43-44 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5,945,162 to Senateur, et al.

With respect Claim 43, Senateur teaches a reaction chamber. (Senateur 4: 38, “Fig. 2”) (“deposition chamber 1”). Senateur teaches means for forming finely divided liquid particles. *See* (Senateur 4: 34-37) (describing injectors from diesel or “car thermal motor”). This is being interpreted as the “periodic injection system.” The portion of the injector which “injects” is being interpreted as the injector head required by the claims. Likewise, the connection ring required by the claims is being interpreted as the union between the injector and reactor, suggested by

Senateur. (Senateur “Fig. 2”). Senateur teaches a carrier gas intake (Senateur 4: 38-43) and a heater or evaporation device (Senateur 6: 6-29). As to Claim 44, Senateur teaches carrier gas intake tubes. (Senateur 6: 30-37).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

I. Claims 43-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,945,162 to Senateur, et al.

With respect Claims 43-44, Senateur teaches a reaction chamber. (Senateur 4: 38, “Fig. 2”) (“deposition chamber 1”). Senateur teaches means for forming finely divided liquid particles. *See* (Senateur 4: 34-37) (describing injectors from diesel or “car thermal motor”). This is being interpreted as the “periodic injection system.” Senateur teaches a carrier gas intake (Senateur 4: 38-43) and a heater or evaporation device (Senateur 6: 6-29). As to the “connection ring” and “carrier gas intake” language of Claim 43, note that Senateur teaches a carrier gas intake pipe in close proximity to the injector. (Senateur 6: 31-33). To the extent the claim requires some arrangement of carrier gas inlet and connection ring not taught by Senateur – and notwithstanding the ambiguities noted above – positioning the carrier gas intake in proximity to the injection system is an obvious matter of design choice. The multi-flow embodiment contemplated by Senateur suggests that positioning the carrier gas intake near the injector or within the injector housing would enable greater control. *See generally* (Senateur 6: 6-53)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL C. MCCracken whose telephone number is (571)272-6537. The examiner can normally be reached on Monday through Friday, 9 AM - 6 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel C. McCracken/
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